Preconference Workshops

Workshop 1

Composite Repairs for Piping and Other Structures

Presented by Shaun Ahern, Managing Director for Carbontech Middle East

About the Speaker

Shaun Ahern is the Managing Director for Carbontech Middle East. He is also a qualified composite repair systems supervisor and instructor having experience on many different systems.

He has 15 years of experience developing composite repair services within the Middle East market as well as a further 15 years working within high temperature processes and oil & gas industries in various operational and project management roles in over 40 countries around the globe.

He has a Diploma in Business Management and an MSc in Project Management from the University of Liverpool.

The purpose of this workshop is to provide an overview of the process of the application of composite repairs to ensure a successful long-term repair. The process of application will be explained in detail and will include:

- Material selection
- Qualification testing
- Design
- Installation
- QA/QC processes
- Operational issues

While expanding on the detail of each of these important aspects of the application of composite repairs reference to the relevant standards, ISO/TS 24817 and ASME PCC-2 Article 4.1 will be made.

As with any repair technique there are limitations in the performance of the chosen solution. These restrictions will be discussed and include:

- Types of defects that can and cannot be repaired, e.g. internal corrosion, external corrosion, through wall defects
- Application conditions, e.g. live repairs, humidity, ambient temperature, surface preparation
- Performance limits, e.g. maximum temperature and pressure
- Compatibility of the repair with the service conditions
• Component types that can and cannot be repaired, e.g. straight pipes, bends, tees, temporary clamps, flanges, tanks and vessels.

The key technology for the successful application of composite repairs is the adhesion of the repair onto the substrate. Particular emphasis will be placed on what variables influence the adhesion of the repair. The main variables are the resin used in the repair, the surface preparation procedure and the substrate material. The effect of these individual variables will be presented and quantified.

Finally a few representative examples of applications will be presented which will highlight the range in pipework, tank and vessel geometries, dimensions and service conditions that can be repaired demonstrating that damaged components can be returned to their original integrity using composite repairs.

**Workshop 2**

**Elastomer, Thermoplastic and TCP Qualification Programmes at a Material Level**

*Presented by Glyn Morgan, Technical Manager, Energy, in Element Materials Technology*

For obvious reasons, non-metallic materials (polymers) need qualifying before being used in critical energy industry applications and components. This ensures that in service the best possible material has been chosen for both short term and long term performance.

The Workshop will explain the polymer qualification process for elastomers and thermoplastics using ISO 23936 as a basis, and discuss the properties necessary for gas decompression resistance and long term chemical ageing effects, how these are monitored and measured and how they influence final product performance. Also, an overview of the qualification of TCP materials (composites) and products relevant to DNV F119 will be discussed and how these differ from polymers that are not fibre reinforced and the additional understanding this requires and uniqueness they confer.

Samples showing typical materials and failure modes will be available for inspection and handling.

**About the Speaker**

Glyn has been using and testing non-metallic materials since acquiring a chemistry degree back in the 1980s. Much of this experience has involved determining how well materials will continue to perform in service, whilst operating under a variety of conditions. His interest in permeation started with trying to eliminate moisture entering optical systems and measuring leakage using helium and mass spectrometry. This developed into measuring the passage of liquids and high-pressure gases through elastomers, thermoplastics and composites in the oil and gas and energy industries. He believes that permeation, diffusion and solubility are the cornerstone of understanding many aspects of non-metallic material behaviour whilst in service - such as long-term ageing and chemistry, short-term gas effects like swelling and blistering, and many other physical property changes which impact component life. Recently, hydrogen and carbon dioxide have taken centre stage because of the energy transition and increasing CCUS applications.
Workshop 3
Introduction into Composites and Resolving Reliability Issues
Presented by Michael Yee, Principal of RT Consults

First Part:
- How it is made
- Materials of construction
- Material selection
- Examples of composite construction (handouts)

Second Half:
- Reliability issues with composites
- Industrial and commercial applications
- Damage mechanisms
- Troubleshooting root cause analysis (introduction)
- Q/A session

About the Speaker
Michael Yee is the Principal of RT Consults which is a 3rd-party nonmetallic inspection company for the FRP and nonmetallic coatings industry. He has two offices in Houston Texas USA and in Dubai, UAE. He has over a decade and a half of experience in the nonmetallic industry and is a NACE/AMPP Level III Certified Coating Inspector with a background in chemical engineering and construction management. He is actively involved in ASME RTP committees and the nonmetallic technical committees at AMPP being the chairman for Nonmetallics, corrosion under insulation, thermoplastic, and fireproofing committees. Michael is an avid presenter for several professional organizations over the years who continues to strive for excellence in providing technical services and support for many leading petrochemical companies in the oil and gas sector, chlorine, sulfuric acid, water treatment, and petrochemical industries.
Workshop 4
Challenges during Nonmetallic Qualification & Construction

Presented by Fahad Rashid Al Matroushi, Non-Metallic Quality Lead, PDO; Imran Al Kharusi, QA/QC Engineer, PDO; and Ramachandrappa Ramanahalli, Non-metallic Specialist, PDO

This workshop will highlight the lessons-learned PDO has gathered during the construction of non-metallic for On Plot and Off plot facilities. The workshop will discuss in depth the construction of nonmetallic line pipe, piping, and their accessories items like fittings and flanges. This workshop will cover different types of nonmetallics like GRE, HDPE, and LLRTP, and will highlight construction requirements of each material, challenges faced during construction (e.g. capability, adherence to specifications and procedures, timeline, and inspections), lessons learned, case studies, and more.

PDO specifications and standards based on the preparation of the installation contractors do for most of the projects together with the changes in construction method statements and field working procedures will be addressed in this workshop.

About the Speakers

Fahad Rashid Al Matroushi is a PGDip mechanical engineer with 22 years of experience in field of design, manufacturing and construction of GRE piping and pipelines system.

Imran Al Kharusi is a Senior Non-metallic QA/QC engineer with over 7 years of experience at PDO. Imran has a Bachelor’s degree in Materials Engineering and an MSc in corrosion control engineering from Manchester University.

Rama Ramanahalli is a nonmetallic specialist in PDO with over 20 years of experience in nonmetallics, ensuring that quality products and services are provided to company in design, manufacturing, construction and operational phases.